

White Paper Report

Report ID: 110280

Application Number: PF-50371-13

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Institution: Pennsylvania Academy of the Fine Arts

Reporting Period: 10/1/2013-9/30/2014

Report Due: 1/31/2015

Date Submitted: 1/29/2015



PENNSYLVANIA ACADEMY
OF THE FINE ARTS

White Paper, NEH SCHC Planning Grant PF-50371-13

Collections and Archives Storage Improvements Planning Project

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The Pennsylvania Academy of the Fine Arts (PAFA)

January 28, 2015

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Introduction

The Pennsylvania Academy of the Fine Arts (PAFA) was awarded an NEH SCHC Planning Grant (2013-14 project period) for planning collection and archives storage improvement for the purpose of identifying long-term solutions for decongesting storage and providing improved and energy efficient environmental conditions for the Collection and Archives. The grant supported the evaluation of candidate spaces for storage expansion in PAFA's two existing buildings for identification of potential passive energy savings through efficiencies in storage location and construction. Lead consultant Michael C. Henry, PE, AIA, of Watson & Henry Associates (W&HA), led an interdisciplinary team including Wendy Jessup, of Wendy Jessup and Associates, Inc., and Laura Hartz Stanton and Mary Schobert from the Conservation Center for Art and Historic Artifacts, that convened with Museum staff to assess storage space needs and environmental conditions and to study candidate spaces for storage expansion. Three candidate spaces were considered for storage:

- 1) existing storage in the basement of PAFA's Furness-Hewitt Historic Landmark Building (1876),
- 2) the undeveloped basement of the neighboring Samuel M.V. Hamilton Building (1916), and
- 3) the undeveloped fifth floor of the Hamilton Building.

Michael Henry and PAFA staff, including Paintings Conservator Judy Dion, Museum Director Harry Philbrick, and Director of Operations Ed Poletti, worked closely during the shaping of the grant application to determine key objectives to be addressed by the Planning Grant, including providing solutions toward:

- Reducing physical risk to collections through decongestion and reallocation of storage and minimizing handling and movement of works of art;
- Increasing intellectual and physical access to the Collections and Archives;
- Improving the storage environment for Collections and Archives to prolong longevity of the stored collections;
- Minimizing risk to the historic building fabric and prolonging the preservation of the buildings in storage areas through envelope improvements;
- Determining realistically achievable goals for storage environments in current and candidate storage spaces based on specific building construction with proposed envelope improvements in current storage and/or new envelope construction in the candidate spaces (guiding documents include the 2011 ASHRAE *HVAC Applications Handbook, Chapter 23: Museums, Galleries, Archives and Libraries*);
- Maintaining all Collections and Archives storage within PAFA's current two buildings and providing space for at least ten years of predicted growth.

The outcome of the study was a two-part report (*Works on Paper and Archives Improvement Plan, November 2014*, and *Paintings and Sculpture Storage Improvements Plan, January 2015*) prepared by W&HA based on the PAFA's individualized needs for improvement of collections stewardship. Guidance and recommended improvements include the following:

- Consolidation and regrouping of previously dispersed Collection storage based on material/medium and the building in which works are to be exhibited;
- Consolidation of collections most frequently accessed for scholarship or academic use by the School of Fine Arts, and the provision of previously lacking adjacent space for handling, care, and study of these works;
- Prioritization of storage needs of grouped works based on those works' vulnerabilities to varying degrees of environmental control, and correlation of prioritized works with optimal candidate spaces;
- Proposed relocation of works most vulnerable to loss from flooding from a basement location to an above-grade location;
- Preparation of a detailed space needs matrix for decongestion and growth of grouped works including square footage required for each and units of compacting storage, flat files, shelves, and sliding or fixed screens needed for each group; and
- Detailed design guidance for use in improving or creating energy-efficient envelopes suitable for the environmental conditions for each of the candidate spaces, from construction through finishes.

The recommendations from W&HA have been incorporated into a phased expansion of storage in PAFA's newly adopted *Campus Master Plan* developed by architectural firm Westlake Reed Leskosky. The first phase of storage improvement and expansion will be the construction of a suite for the storage, cataloging, care and study of PAFA's Works on Paper and Archives collections on the fifth floor of PAFA's Hamilton Building. Currently in the schematic design phase, construction of this facility is the subject of a 2014 application (pending) for an NEH SCHC Implementation Grant; construction and furnishing will also be financed from proceeds of an ongoing capital campaign. Further phases of *Campus Master Plan* implementation guided by recommendations made by W&HA will include envelope improvements to and building of new storage in the basement of the Hamilton Building to house modern and contemporary paintings and sculpture, and envelope improvements to and reorganization of the existing collections storage in the Historic Landmark Building's basement level for storage of historic painting and sculpture.

Background

The Pennsylvania Academy of the Fine Arts, founded in 1805 as a museum and school of fine arts, occupies two buildings in center city Philadelphia. The Historic Landmark Building (1876,

Furness and Hewitt, Architects, National Historic Landmark designated) was built for PAFA to replace an earlier structure lost in a fire. The adjacent Samuel M. V. Hamilton Building (1916, Gomery-Schwartz Motor Company Building, Oelschlager, Architect) was acquired and renovated for use by PAFA from 2003-2008. PAFA's collection of 14,000 works of art is composed of works on paper (65%), paintings (20%), photographs (10%), and sculpture, ephemera and decorative arts (5%). PAFA's art collection and its historic archives are currently stored in the basement of the Historic Landmark Building with a small number of contemporary paintings and sculpture stored in two *ad hoc* storage spaces in the Hamilton Building.

The number of works in the Collection has nearly doubled since the last major renovation of storage in the early 1970's. The majority of PAFA's recent annual acquisitions are large, contemporary works, and this is a trend that is expected to continue well into the future. Over the past several decades conditions in storage have gradually deteriorated to the point that works of art are at greatly increased risk of damage due to overcrowding. The exposed masonry surfaces in the basement storage areas of the Furness-Hewitt Historic Landmark Building (HLB) are showing signs of damage due to conditioning of the storage areas. The combination of a porous building envelope and environmental controls that are beyond their expected service life contribute to a less-than-optimal storage environment in terms of temperature, relative humidity, air quality, and operating costs.

In 2012, PAFA applied for an NEH SCHC Planning Grant in order to determine storage expansion space needs and building envelope improvements so that they may responsibly store the growing Collection and Archives while preserving their historic buildings. In 2013, through the grant award, PAFA engaged the W&HA team to assess the present collections storage areas and environments, to estimate the spatial requirements for storage and to evaluate three candidate areas for future archives and collections storage: the basement of the Historic Landmark Building; the basement of the Hamilton Building; and the fifth floor of the Hamilton Building. At the same time, PAFA engaged Westlake Reed Leskosky (WRL) to develop a *Campus Master Plan*, incorporating the spatial and environmental recommendations for collections storage identified by Watson & Henry Associates. The development of the *Campus Master Plan* began after submission of the Planning Grant application. PAFA received notification of the grant award in July 2013, and a scope change approved by NEH in November 2013 enabled W&HA's work to be integrated with that of the *Campus Master Plan*.

Grant Activities

The collaborative nature of the grant emphasized the importance of the roles of each of the grant's participants. PAFA relied heavily on the expertise of the consultant team assembled and led by Michael Henry in the evaluation of storage needs, the analysis of environmental data,

guidance for envelope improvements and storage design, and in their understanding of the needs of historic structures. The consultant team relied on PAFA staff to provide important background information that would clarify the unique needs of the institution as both a museum and a school of fine arts, including the use by both the Museum and the School of the Collection and Archives. PAFA staff was also instrumental in providing technical information about the existing buildings and school/museum operations that were fundamental to the execution of the project. With work ongoing in the development and implementation of the *Campus Master Plan*, the continuing dialogue between Michael Henry's team, PAFA staff, and WRL's project architects throughout the grant period has been especially important for forming the floor plans, HVAC design, and lighting plans for storage areas and adjacent spaces.

Grant activities centered on consultant work, including (following list excerpted with minor edits from W&HA report):

- Observation of existing collections storage and archives, including housing methods and collections density;
- Rough field measurements of existing collections storage and archives spaces;
- Inventory and rough field measurements of existing collections storage and archives storage equipment;
- Observation of candidate spaces for future collections storage and archives;
- Interviews with PAFA staff;
- Retrieval of data from collections and archives inventories provided by PAFA staff;
- Analysis of environmental monitoring data collected by PAFA staff;
- Review and comment on the draft WRL *Campus Master Plan*;
- Review and comment on several iterations of the draft WRL schematic design documents for the proposed *Works on Paper and Archives Suite*; and,
- Ongoing consultation with Judy Dion, Paintings Conservator at PAFA during the initial assessment, now current Consultant to PAFA.

Results

PAFA's needs for expansion and the evaluation of the suitability of candidate spaces were quantified by the Collections Storage Space Requirements Study and by analysis of representative data from nine months' of environmental data collected by HOBO® U12-011 data loggers (Onset Computer Corporation) deployed throughout storage areas and in the candidate spaces. Both aspects were combined for making recommendations based on PAFA's individualized needs.

Storage Environment: After analysis of environmental data, candidate spaces were categorized according to classes of control listed in Table 3 of Chapter 23 *Museums, Galleries, Archives and Libraries* of the 2011 *ASHRAE HVAC Applications Handbook* (referred to subsequently as Class A, B, or C). Correlation of natural aging of objects and mechanical risk to stored collections was illustrated by use of the Image Permanence Institute's Preservation Index© and Time-Weighted Preservation Index© (abbreviated respectively as IPI, PI, and TWPI, and described further here: <https://www.imagepermanenceinstitute.org/environmental/research/preservation-metrics>).

Analysis of environmental data for seasonal statistics based on current building envelopes indicated that the current storage space in the Historic Landmark Building basement was achieving a Class C level of control; however with improvements, Class B control could be achieved year-round, with Class A control attainable for most of the winter. Properly modified with new construction and envelope improvements, the candidate spaces in the Hamilton Building could both achieve Class A control, with optional modification to cooler conditions to slow natural aging of stored works.

The differences between Classes A and B reside mainly in slightly increased mechanical risk (damage from dimensional change in constrained objects, usually due to fluctuations in relative humidity) for high vulnerability works stored under Class B controls. Expected natural aging (biological deterioration) is relatively similar between the two classes, however it can be slowed in both by maintaining lowered storage temperatures. According to this analysis and the proposed allocation of storage, all of the objects considered to be of highest vulnerability to mechanical damage, including contemporary paintings and sculpture, will be stored in Class A conditions, which poses “no risk” of mechanical damage; works on paper and photographs will be in Class A “cool, dry” conditions to slow natural aging. Even in Class B conditions, less vulnerable objects, such as aged paintings and sculptures, are only at “tiny risk” of mechanical damage.

Space Needs: The Collections Storage Space Requirements Study grouped the collection by medium and execution date where applicable, and for each group took into account:

- Current reference data: current location, storage unit type and dimensions, and current quantity of units;
- Storage units needed to properly house existing collection;
- Storage units needed to properly house collection based on 10 years of predicted growth;
- Total linear feet of units needed;
- Spacing, access, and clearances needed for recommended units (including compacting units);
- Overall storage space required;

- Proposed location of expanded storage based on prioritization of object vulnerability and environmental controls anticipated to be realized for each space.

Recommendations and Design Guidance: As described in their reports, W&HA determined that the basement of the Historic Landmark Building contained insufficient space for housing all of collections and archives storage. Low ceilings and thick, load-bearing masonry walls interfered with the movement and storage of large works of art, precluded the use of movable-aisle shelving units to increase space use efficiency, and made it impractical to construct “box-within-a-box” enclosures within the small structural bays of the basement. The alternative envelope upgrade, creating buffer zones along the exterior basement walls, will reduce the floor area available for storage.

Therefore, following spatial analysis, W&HA advocated an expansion of storage into the candidate spaces in the Hamilton Building. As the only candidate space located above grade, the fifth floor offered the greatest advantages for constructing an accessible, resilient, and energy efficient “box-within-a-box” storage facility for both collections and archives. However with additional claims being made on the space to address other programmatic needs within PAFA’s *Campus Master Plan*, claims on space were competitive, and the full floor could not be completely dedicated to storage. Therefore W&HA proposed that the Works on Paper collection and the Archives – the groups of works most at risk to flooding damage and most needful of optimized environmental conditions – be consolidated into a storage, care, and study suite located on this floor. The expected lifetime of the works stored in the suite will be greatly improved through the construction of a fully interior, energy efficient, “cool, dry” (modified) storage zone set to $60^{\circ}\text{F} \pm 5^{\circ}$ year-round, with 30% RH winter minimum to 50% RH summer maximum with $\pm 5\%$ RH short term fluctuation.

The Works on Paper Collection (including photographs) comprises three quarters of PAFA’s Collection, and along with the Archives, it is the part of the Collection most frequently requested for study by class groups and outside scholars. The case for creating this suite was made more compelling by PAFA’s desire to relocate the Fine Arts Library to that floor. Together, the storage suite and the library will create a highly accessible, publicly available academic resource that will benefit the Museum and the School, as well as the public. W&HA and current and former PAFA staff worked with WRL through finalization of the schematic design phase in order to create a suite best suited for both storage, access, and collections care (Fig. 1)

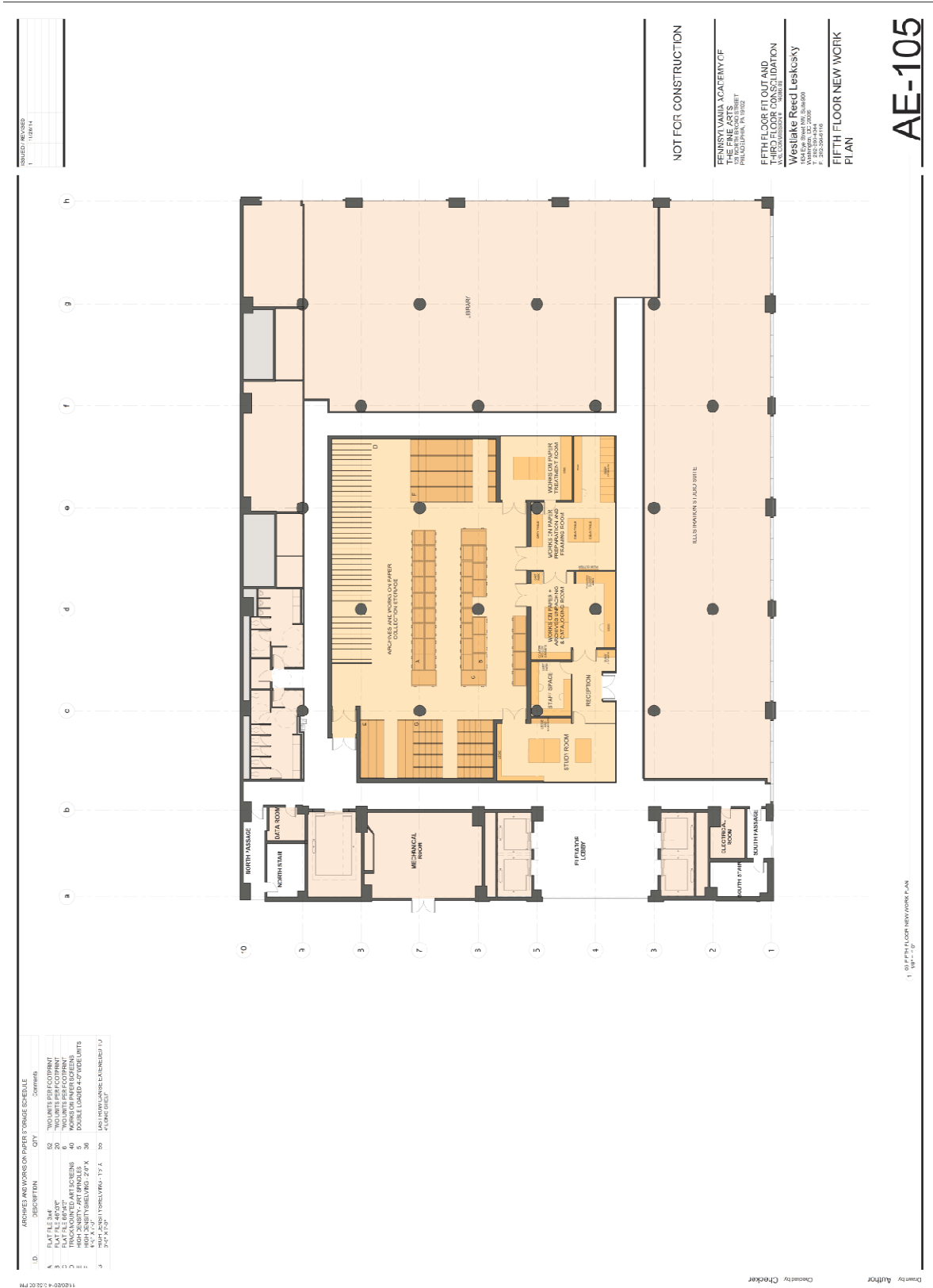


Figure 1. Schematic design of Hamilton Building 5th floor, featuring Works on Paper and Archives Suite designed with guidance provided by W&HA and staff input.

The remaining 25% of the Collection, including paintings and a small number of sculptures, will be split between PAFA's two buildings based on the locations in which they are most frequently exhibited. With PAFA's Historic Landmark Building (HLB) being dedicated to mostly historical through mid-20th-century art, these works will be housed in improved storage in the HLB basement. Modern and contemporary art will be housed in newly constructed storage in the basement of the Hamilton Building. This plan minimizes the amount of between-building movement to which works will be subjected. It also places the modern and contemporary art, which is typically more vulnerable to mechanical aging due to environment than historical art, in the best achievable environmental conditions of the two spaces. Though maintaining storage in the basements of both buildings is not ideal due to flood risk, it is a necessary compromise that will permit PAFA to store the whole collection on-site, which further minimizes handling and movement of the collection and represents a significant savings in operating and staffing costs.

The recommended improvement of all spaces will increase operating efficiency of the spaces and help to control costs and fuel and electrical consumption while delivering a high standard of care.

Evaluation and Lessons Learned

PAFA staff considers the grant activities to have been tremendously successful due to the combined work of the team – including the consultants and PAFA staff – assembled to undertake the grant activities. With the timing of the grant period aligning with the development of PAFA's *Campus Master Plan*, both Executive and Collections staff have the extraordinary resource of W&HA's reports and the consultants' continued advice for implementation of the *Campus Master Plan*. (Michael Henry agreed to continue to work with PAFA following the end of the grant period.)

Examination of the activities undertaken from shaping the application to the end of the grant period identified several aspects that promoted a successful outcome, including:

- PAFA had important preservation guidance in hand prior to applying for the grant. A recently completed Long-Range Preservation Plan prepared for PAFA by the Conservation Center for Art and Historic Artifacts helped prioritize the needs of the institution; however even with this in hand, it was difficult at first for staff to determine exactly which long-range project among many potential projects was the best suited for the grant opportunity.
- The consultants assisted staff in shaping the grant application. Michael Henry visited PAFA as staff were putting together the application, and had viewed current storage and the candidate spaces before submission of the application. This visit and later

conversations gave the team an early understanding of the key objectives PAFA hoped to accomplish through the Planning Grant (see page 1).

- PAFA had essential institutional information and documents available for review by the consultant team before, during, and after the site visit, including data available for export from a complete collections database and a Collecting Plan that helped inform trends for past and future Collections growth.
- The consultant team and PAFA staff communicated frequently and in depth to permit the team and staff to develop a full understanding of the unique needs of the institution, including its duality as a museum and school, and the use of the Collection. In PAFA's case, instances of successful communication can be expressed in three ways:
 - By scheduling time during the site visit for the consulting team to meet individually with staff members whose work impacts collections storage and collecting, including PAFA's: Museum Director, both Registrars, both Curators, the Conservator, the Digital Assets Manager, and the Director of Operations. Unfortunately the two Preparators' installation schedules did not permit a meeting with the consultants; their input and that of a framing technician hired after the site visit would have been useful.
 - Via group discussion involving staff and the consultants at the conclusion of the site visit; an informal back and forth among the staff and consultant team led to a fruitful discussion that provided the team with valuable thoughts for the consultants' subsequent recommendations.
 - Through review and discussion of the schematic designs for the *Campus Master Plan* where storage was involved, followed up by communication with the project architects.
- PAFA staff accepted that in order to achieve the most important objectives addressed by the grant – minimizing risk to the collection and increasing access while remaining within the existing building footprints – some flexibility was necessary on other points. Despite the compromises, a successful plan emerged with prioritization of collections based on risk, as described above in the Results section. This included:
 - Accepting the fact that some storage will remain at basement level, while those works prioritized as most at risk to flood damage will be stored above grade.
 - Acknowledging that, even after envelope improvements are made, it will not be possible, and it is not necessary, to achieve "Class A" controls in all storage spaces. However with prioritization of the collection from least to most vulnerable to damage from environmental factors, the most vulnerable works have been matched with the most rigorously controlled space.

Continuation

With the planning phase as identified in the grant complete, PAFA is continuing with the project to implement the recommendations made by the consultant team. The recommendations have been integrated into the *Campus Master Plan*, which is undergoing phased implementation over the next several years. The first phase will include the construction of a Works on Paper and Archives suite, which is the subject of a pending application for an NEH SCHC Implementation Grant. Michael Henry and his team will continue to offer design guidance in the finalization of schematic designs for storage for the Painting and Sculpture collections.

Conclusion

With implementation of the recommendations made possible by this Planning Grant, PAFA will be providing greatly increased care for its collection through improvements in both storage conditions and storage environment. Congested and scattered storage areas will be reorganized by medium or time period and grouped according to environmental needs and anticipated use. The plan takes into account preservation of PAFA's buildings as well as the collection, while controlling operating costs through efficient operation of proposed spaces. Access to the growing collection will be greatly improved for the Museum, the School, and the public for years to come.



PAFA's Campus on North Broad Street in Philadelphia. At left, PAFA's Historic Landmark Building (HLB), designed for PAFA by architects Frank Furness and George Hewitt, and considered one of the finest surviving examples of Victorian Gothic architecture in America. PAFA's Lenfest Plaza, including Claes Oldenburg's *Paint Torch* (2011) sculpture, lies between the HLB and PAFA's Samuel M.V. Hamilton Building (right), which was renovated for PAFA's use beginning in 2005. Constructed in 1916, the building was designed by Charles Oelschlagel for Gomery-Schwartz Motor Company to serve as an automobile showroom and storage facility.

Photo by Tom Crane